I. Response to Claim Rejections under 35 U.S.C. § 103

In paragraph 3 of the Action, claims 1, 3 and 15 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Sigai (US '124) and Bechtel (US '047) in view of each other.

In paragraph 4, of the Action, claims 1, 3-4 and 15 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Kasenga et al (US '707) in view of Mizuta et al (US '654) and Bechtel (US '047).

Applicant traverses the rejections and submits that the references do not teach or suggest the claimed invention for the following reasons.

A. Present Invention

The present invention provides a process for producing a vacuum ultraviolet ray-excited light-emitting phosphor comprising the steps of mixing an aluminate phosphor compound with a coupling agent comprising an aluminum compound, and calcining the mixture, wherein the coupling agent contains a 1, 3-diketone structure as recited in claim 1.

In the process of the present invention, a coupling agent comprising an aluminum compound and a 1, 3-diketone structure is used as a raw material. The coupling agent can be distributed uniformly without forming a precipitate of an aluminum compound since the hydrolysis speed thereof is extremely high. See page 6, lines 8-11 of the present specification.

According to the process of the invention, a vacuum ultraviolet ray-excited light-emitting phosphor having an excellent life property of maintaining light-emitting brilliance over time is obtained. See page 6, lines 16-18 and page 8, lines 21-25 of the present invention and Example 1.

B. Disclosure of the References

1. Sigai (US '124) in view of Bechtel (US '047)

The Examiner acknowledges that US '124 does not teach the use of aluminate phosphors and that US '047 does not teach aluminum oxide coatings.

The Examiner asserts that US '124 teaches mixing a manganese-doped zinc silicate phosphor with an aluminum oxide precursor and calcining to form an aluminum oxide coating, and that the precursor may be an acetylacetonate. The Examiner further asserts that US '047 teaches aluminate phosphors that need protective coatings in order to increase their operative lifetimes. It is the Examiner's position that it would have been obvious to one of ordinary skill in the art the time the invention was made to have used the method of US '124 to coat the aluminate phosphors of US '047. See paragraph 8 of the Office Action.

Further, the Examiner states:

> Applicant argues that '047 teaches away from aluminum coating because it teaches coating of other compounds. The argument is unconvincing because '047 does not contain a statement of inoperability necessary to rise to the level of a teaching away. The argument is also unconvincing because it does not address the teachings of the other references of methods to increase phosphor lifetimes. The teachings of '047 of particular methods of protecting phosphors in no way disguise the teachings of '707, '654, or '124 of other suitable methods of protecting phosphors.

See paragraph 5 of the Office Action.

However, Applicants respectfully submit that US '047 discloses "the anhydrous catena-polyphosphates of the type mentioned above form a hard, water-insoluble coating on the phosphor particles, they do not react with the UV-phosphors." See column 1, lines 57-59. Accordingly, US '047 teaches that a compound, being mixed with an aluminate phosphor, does

not react with the aluminate phosphors. Therefore, US '047 does not explicitly disclose that the coating compound may react with the aluminate phosphors contrary to the Examiner's assertion.

On the other hand, a coupling agent with a 1, 3-diketone structure, such as acetylacetonate disclosed in US '124 is able to react with aluminate phosphors. See page 474 of McGraw-Hill Dictionary of Scientific and Technical Terms, 5th Edition attached hereto.

Therefore, US '047 teaches away from a coupling agent with a 1, 3-diketone structure as an aluminum oxide precursor to form an aluminum oxide coating on the aluminate phosphors and there is no motivation to combine US '124 with US '047.

Thus, the Examiner has not established a prima facie showing obviousness with respect to claim 1.

2. Kasenga (US '707) in view of Mizuta (US '654) and Bechtel (US '047)

As the Examiner admits, US '707 teach neither the use of an aluminum 1, 3-diketone coupling agent as the precursor nor the use of its method to coat an aluminate phosphor.

US '654 does not teach a method to coat an aluminate phosphor.

US '047 does not suggest the use of the coupling agent as the coating precursor, the equivalence of nitrates to other precursors, including acetylacetonates, as precursors to form aluminum oxide coatings on aluminate phosphor for the reasons set forth above and therefore such is not considered to be well known in the art.

Therefore, even if US '707 or US '654 were combined with US '047, the claimed invention would not have been achieved.

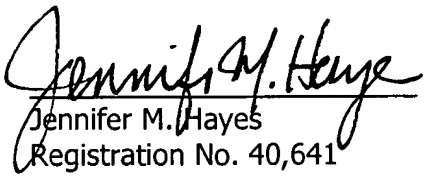
Thus, claims 1, 3, 4 and 15 are non-obvious over US '124 in view of US '047 or US '707 in view of US '654 and US '047. Accordingly, Applicants respectfully request withdrawal of the rejection under 35 U.S.C. § 103.

II. Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



Jennifer M. Hayes
Registration No. 40,641

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

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McGraw-Hill Dictionary of Scientific and Technical Terms

Fifth Edition

Sybil P. Parker
Editor in Chief

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would be thermodynamically unfavorable. ['kəp·əld rē'ak·shən]

coupled systems [COMPUT SCI] Computer systems that share equipment and can exchange information. [PHYS] Mechanical, electrical, or other systems which are connected in such a way that they interact and exchange energy with each other. ['kəp·əld 'sis·təmz]

coupled transistors [ELECTR] Transistors connected in series by transformers or resistance-capacitance networks, in much the same manner as electron tubes. ['kəp·əld tran'zis·tərz]

coupled wave [FL MECH] A surface wave which is being continuously generated by another wave having the same phase velocity. Also known as C wave. ['kəp·əld 'wāv]

coupler [ELEC] A component used to transfer energy from one circuit to another. [ELECTROMAG] 1. A passage which joins two cavities or waveguides, allowing them to exchange energy. 2. A passage which joins the ends of two waveguides, whose cross section changes continuously from that of one to that of the other. [ENG] A device that connects two railroad cars. [GRAPHICS] A substance that can react with the unexposed diazonium salt in a diazo material to produce the visible dye image. [NAV] The portion of a navigation system that receives signals of one type from a sensor and transmits signals of a different type to an actuator. ['kəp·lər]

coupling [ELEC] 1. A mutual relation between two circuits that permits energy transfer from one to another, through a wire, resistor, transformer, capacitor, or other device. 2. A hardware device used to make a temporary connection between two wires. [ENG] 1. Any device that serves to connect the ends of adjacent parts, as railroad cars. 2. A metal collar with internal threads used to connect two sections of threaded pipe. [MECH ENG] The mechanical fastening that connects shafts together for power transmission. Also known as shaft coupling. ['kəp·liŋ]

coupling agent [CHEM] A substance that can react with both reinforcement and matrix components of a composite material to form a binding link at their interface. ['kəp·liŋ ˌā·jənt]

coupling aperture [ELECTROMAG] An aperture in the wall of a waveguide or cavity resonator, designed to transfer energy to or from an external circuit. Also known as coupling hole; coupling slot. ['kəp·liŋ ˌap·ər·chər]

coupling capacitor [ELECTR] A capacitor used to block the flow of direct current while allowing alternating or signal current to pass; widely used for joining two circuits or stages. Also known as blocking capacitor; stopping capacitor. ['kəp·liŋ kə'pas·əd·ər]

coupling coefficient [ELECTR] The ratio of the maximum change in energy of an electron traversing an interaction space to the product of the peak alternating gap voltage and the electronic charge. [PHYS] *See* coupling constant. ['kəp·liŋ ˌkō·i'fish·ənt]

coupling constant [PARTIC PHYS] A measure of the strength of a type of interaction between particles, such as the strong interaction between mesons and nucleons, and the weak interaction between four fermions; analogous to the electric charge, which is the coupling constant between charged particles and electromagnetic radiation. [PHYS] 1. A measure of the strength of the coupling between two systems, especially electric circuits; maximum coupling is 1 and no coupling is 0. Also known as coefficient of coupling; coupling coefficient. 2. A measure of the dependence of one physical quantity on another. ['kəp·liŋ 'kän·stənt]

coupling hole *See* coupling aperture. ['kəp·liŋ ˌhōl]

coupling loop [ELECTROMAG] A conducting loop projecting into a waveguide or cavity resonator, designed to transfer energy to or from an external circuit. ['kəp·liŋ ˌlüp]

coupling probe [ELECTROMAG] A probe projecting into a waveguide or cavity resonator, designed to transfer energy to or from an external circuit. ['kəp·liŋ ˌprōb]

coupling slot *See* coupling aperture. ['kəp·liŋ ˌslät]

coupon [CHEM ENG] Polished metal strip of specified size and weight used to detect the corrosive action of liquid or gas products or to test the efficiency of corrosion-inhibitor additives. Also known as corrosion coupon. ['kü,pän]

Courant condition [FL MECH] A condition on numerical hydrodynamics calculations requiring that the time interval employed be no greater than that required for a sound wave to cross a spatial cell. ['kür,änt kən,dish·ən]

course [CIV ENG] A row of stone, block, or brick of uniform height. [NAV] The intended direction of travel expressed as an angle in the horizontal plane between a reference line (true magnetic north) and the course line (the line connecting the point of origin and the point of destination), usually measured clockwise from the reference line. Also known as desired track. [TEXT] A row of stitches across a knitted fabric; corresponds to the filling in woven fabric. [kȯrs]

course angle [NAV] Course measured from 0° at the reference direction clockwise or counterclockwise through 90° or 180°; it is labeled with the reference direction as a prefix and the direction of measurement from the reference direction as a suffix; for example, course angle S 21° E is 21° east of south, or course 159°. ['kȯrs ˌaŋ·gəl]

coursed rubble [CIV ENG] Masonry in which rough stones are fitted into approximately level courses. [ˌkȯrsd 'rəb·əl]

course error [NAV] Angular difference between the course and the course made good. ['kȯrs ˌer·ər]

course line [NAV] 1. A line of position plotted on a chart, parallel or substantially parallel to the intended course of a craft, showing whether the craft is to the right or the left of its course. 2. Any line representing a course. ['kȯrs ˌlīn]

course linearity [NAV] In equisignal radio-range-type beacons, the change in the difference in the depth of modulation of the two signals which produce the course with respect to displacement of the measuring position from the course line but within the course sector. ['kȯrs ˌlin·ē'ar·əd·ē]

course-line computer [NAV] An airborne computer that accepts bearing and distance information derived from ground facilities and uses this data to compute a course from the aircraft's present position to any other point which the pilot selects, providing only that it be within the coverage of the ground facilities; the steering information is displayed on a right-left indicator, while additional displays such as distance to go are also provided. Also known as arbitrary course computer; bearing distance computer; off-line computer; parallel course computer; rho-theta computer. ['kȯrs ˌlīn kəm'pyüd·ər]

course-line deviation [NAV] The angular or linear difference between the actual track of a vehicle and the intended course line. ['kȯrs ˌlīn ˌdē·vē'ā·shən]

course-line deviation indicator [NAV] An instrument that indicates deviation from a desired course line. ['kȯrs ˌlīn ˌdē·vē'ā·shən ˌin·dəˌkād·ər]

course-line selector [NAV] A device providing means for selecting a course to be followed automatically, usually by means of an electronic system of navigation such as omnirange and distance-measuring equipment. ['kȯrs ˌlīn si'lek·tər]

course made good [NAV] The resultant direction of actual travel of a vehicle, equivalent to its bearing from the point of departure. ['kȯrs ˌmād 'gud]

course over the ground [NAV] The direction of the track that a vessel has actually made, measured clockwise from north through 360°. ['kȯrs ˌō·vər thə 'graund]

course programmer [CONT SYS] An item which initiates and processes signals in a manner to establish a vehicle in which it is installed along one or more projected courses. ['kȯrs 'prō,gram·ər]

course recorder [NAV] A device which makes a graphic record of the headings and distances traveled. ['kȯrs ri'kȯrd·ər]

course scalloping [NAV] Irregularities in the field pattern produced by a ground-based beacon caused by terrain features; appears in flight as cyclical variation in the course error. ['kȯrs ˌskal·əp·iŋ]

course softening [NAV] An intentional decrease in course sensitivity as the navigation aid is approached. ['kȯrs ˌsȯf·ən·iŋ]

courseware [COMPUT SCI] Computer programs designed to be used in computer-aided instruction or computer-managed instruction. ['kȯrs,wer]

coursing joint [CIV ENG] A mortar joint connecting two courses of brick or pebble. ['kȯrs·iŋ ˌjȯint]

Couvinian [GEOL] Lower Middle Devonian geologic time. [kü'vin·ē·ən]

covalence [CHEM] The number of covalent bonds which an atom can form. [kō'vā·ləns]

covalent bond [CHEM] A bond in which each atom of a bound pair contributes one electron to form a pair of electrons. Also known as electron pair bond. [kō'vā·lənt 'bänd]